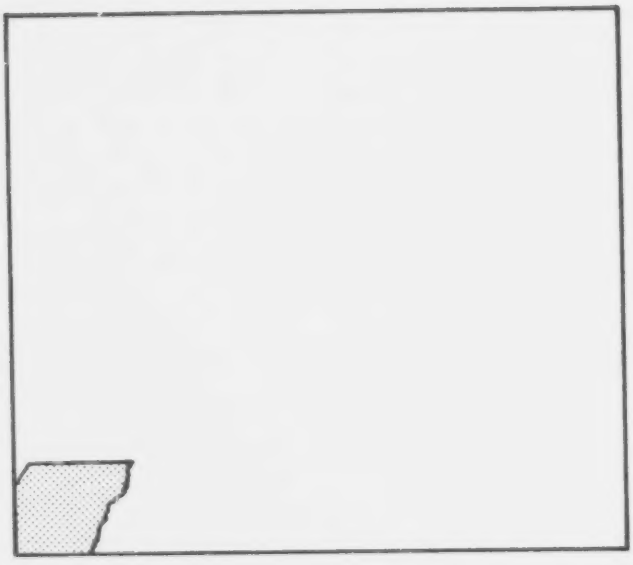
MAR 18 1989

FEMA-B-080285

FLOOD INSURANCE STUDY

MONTEZUMA COUNTY, COLORADO
UNINCORPORATED AREAS



MAY 4, 1989

Federal Emergency Management Agency

COMMUNITY NUMBER - 080285

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY
MONTEZUMA COUNTY, COLORADO (UNINCORPORATED AREAS)

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the unincorporated areas of Montezuma County, Colorado, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This Flood Insurance Study will be used to establish actuarial flood insurance rates and assist the community in their efforts to promote sound floodplain management. Minimum flood-plain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

This Flood Insurance Study was prepared by compiling pertinent information for the flood hazard areas in the unincorporated areas of Montezuma County, Colorado, from existing technical and/or scientific data originally prepared by others for purposes other than the NFIP. This existing data was reviewed by the Federal Emergency Management Agency (FEMA) prior to its use in the development of this Flood Insurance Study to ensure compliance with NFIP regulations.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Department of the Army, Corps of Engineers (COE), Sacramento District, and Muller Engineering Co., Inc. (References 1 and 2).

1.3 Coordination

On May 23, 1988, the results of this Flodd Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the community and the FEMA.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the unincorporated areas of Montezuma County, Colorado. The areas of study are shown on the Vicinity Map (Figure 1).

The areas studied by detailed methods were selected based upon the extent and validity of available existing hydrologic and hydraulic data.

The following streams were studied by detailed methods throughout the county:

- Dolores River was studied from approximately 1,725 feet downstream of 1st Street extended upstream to a point approximately 14,300 feet upstream of Four Corners Bridge, a reach of approximately 8 miles.

- West Dolores River was studied from approximately 585 feet downstream of State Route 145 to a point approximately 2,975 feet upstream of State Route 145, a reach of approximately 0.7 mile.

- Mancos River was studied from a point approximately 3,480 feet downstream of Spruce Street upstream to a point approximately 1,830 feet upstream of Grand Avenue, a reach of approximately 1.7 miles.

- Lost Canyon Creek was studied from approximately 2,240 feet downstream of County Road 30 upstream to a point approximately 4,100 feet upstream of that same highway, a reach of approximately 1.2 miles.

- Chicken Creek was studied from U.S. Highway 160 to a point approximately 230 feet upstream of Walnut Street extended.

The unincorporated areas within the study reaches were studied exclusively.

Approximate methods of analysis were used to study all the remaining areas having a potential flood hazard that did not have available detailed scientific or technical data.

The incorporated cities of Cortez and Dolores, and the Town of Mancos are not included in this Flood Insurance Study.

2.2 Community Description

Montezuma County is located in southwestern Colorado, bordered by San Juan County, Utah, to the west; the Ute Mountain Indian Reservation and San Juan County to the south; La Plata County,

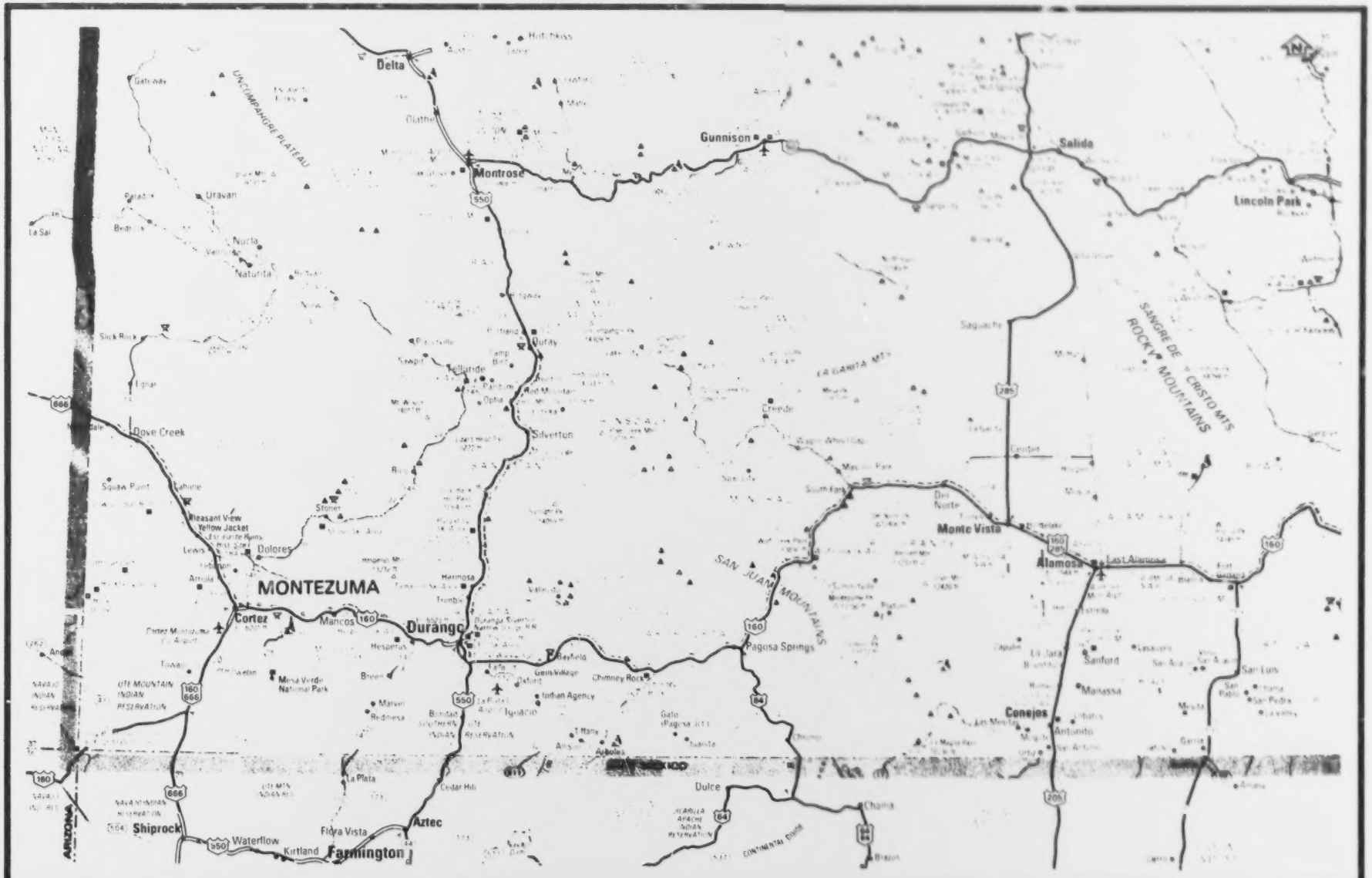


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONTEZUMA CO., CO
(UNINCORPORATED AREAS)

APPROXIMATE SCALE

23 0 23 46 69MILES

VICINITY MAP

Colorado, to the east; and Dolores County, Colorado, to the north.

Dolores River drains approximately 837 square miles upstream from the Town of Dolores. Dolores River has a tributary, West Dolores River, that confluences about 15 miles upstream of the Town of Dolores, while the Dolores River joins the Colorado River in eastern Utah, about 100 miles northwest of Dolores. At the mouth of West Dolores River, drainage is 167 square miles. The West Dolores and Dolores Rivers flow into San Juan Range, reaching elevations around 14,000 feet. Lost Canyon Creek confluences with Dolores River, south of the Town of Dolores, rising to elevations around 10,000 feet in the western slopes of the La Plata Mountains. At the mouth of Lost Canyon Creek, drainage is 72 square miles.

Mancos River drains approximately 83 square miles, excluding the 1.4 square mile tributary to Jackson Gulch Reservoir. Chicken Creek is north of the Town of Mancos and west of the Mancos drainage area. Mancos River rises to an elevation approximately 13,000 feet at the headwaters, lowering to 6,800 feet. Chicken Creek ranges from 11,200 feet to 6,200 feet above sea level. The headwaters of Mancos River are located about 16 miles upstream of U.S. Route 160. Chicken Creek headwaters are 12 miles upstream of U.S. Route 160.

The mean annual precipitation in the Montezuma County area is approximately 16 inches. From July to October, approximately 40 percent of the normal annual precipitation results from rain, generally thunderstorms. From November to June, the remaining 60 percent of the normal annual precipitation occurs as snow. Winters are long and cold, with mean daily temperatures of approximately 30°F between November and March. Summers are short and hot with mean daily temperatures greater than 90°F (Reference 2).

According to the U.S. Bureau of the Census, the population in the county grew from 12,952 in 1970 to 16,510 in 1980, an increase of 27.5 percent (Reference 3).

2.3 Principal Flood Problems

The nature of flooding problems within the study area include: general frontal type rainstorms, convective type cloudbursts, and snowmelt. Cloudburst storms can constitute a severe flood threat; but, due to small aerial extent, small volume of runoff, and short duration of this type of storm, a significant flood threat is present only in the smaller drainage areas such as Lost Canyon Creek.

Frontal type rainstorms present the most serious flood hazard in the county. In May to June the combination of spring snowmelt runoff and thunderstorms perpetuate the potential for severe flooding. Antecedent ground moisture also contributes to flood

characteristics. The veracity of this point is based on historical documentation provided by area newspapers. Newspaper records, as well as stream gage records, indicate that high water and major flood events have occurred since the area was settled in 1376, particularly in 1909, 1911, 1932, 1937, 1938, 1941, 1944, 1949, 1957, 1973, and 1979. Flood loss in the West Dolores River, Dolores River, and Lost Canyon Creek is usually limited to damage of bridges and irrigation structures. Frontal type rainstorms in October 1911 caused the largest flood of record in the drainage areas of the Dolores and West Dolores Rivers, flooding much of the Town of Dolores.

The Mancos Times Tribune reported that the floods of 1909 and 1911 caused damage to the Post Office and various commercial and warehouse structures. In 1957, flood damage was limited to irrigation structures. Floods in May 1973 and May 1979 (1,110 and 1,575 cubic feet per second (cfs), respectively), caused substantial bank erosion in and around the Town of Mancos. The May 31, 1979, flow was significantly less than the 50-year recurrence interval flood (Reference 2).

2.4 Flood Protection Measures

Construction of rock and dirt embankments near bridges throughout the county by the Montezuma County and the Colorado State Highway Department crews, and bank protection work along the Mancos River banks at the sewage lagoons near the Town of Mancos completed by the COE in December 1973, constitute the only existing flood structures in the study area which could reduce the present flood hazard.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this Flood Insurance Study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, or 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this Flood

Insurance Study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the community.

Peak discharges for floods of the 10-, 50-, 100-, and 500-year recurrence intervals were determined by utilizing a flow-frequency analysis of flows at the "Below Rico" (1914-15, 1919-21, and 1952-present) and "At Dolores" (1896-1903, 1911-1912, and 1922-present) stream gaging stations on the Dolores River, Gage Numbers 09165000 and 09166500, respectively, and following guidelines established by the U.S. Water Resources Council. To determine the type of event that would cause the larger, less frequent floods, snowmelt floods and rain floods at the Dolores Gage were separated and statistically analyzed. At the Rico Gage this type of analysis was never determined because of the short period of record.

Based on the flows of the 1970 flood at the Dolores and Rico Gages, Snyder S-Curve and optimization techniques were used to develop unit hydrographs for the Dolores River. Optimization of the unit hydrograph for Lost Canyon Creek was achieved by using data from the October 13, 1941, storm and flood. Loss rates, consistent with studies performed by the COE, Los Angeles District, and the U.S. Bureau of Reclamation, calculated by the COE, Sacramento District (Reference 1), were found to be reasonable and accurate.

Peak discharges for floods of the 10-, 50-, 100-, and 500-year recurrence intervals for the Mancos River were based on a flow-frequency analysis prepared by the COE (Reference 3). In the analysis, the flood peak estimates were determined from a regional analysis of peak flow data from stream gaging stations in the area.

Peak discharges for floods of the 10-, 50-, 100-, and 500-year recurrence intervals for Chicken Creek were computed using regionalized basin parameters determined by the COE for the Mancos River. Comparative hydrologic calculations were also determined for the Chicken Creek Basin using the Manual for Estimating Flood Characteristics of Natural-Flow Streams In Colorado (Reference 4), as well as unit area discharges.

Peak discharge-drainage area relationships for the West Dolores River, Dolores River, Lost Canyon Creek, Mancos River, and Chicken Creek are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

Flooding Source and Location	Drainage Area (Sq. Miles)	Peak Discharge (cubic feet per second) 10-Year	50-Year	100-Year	500-Year
Dolores River					
Just downstream of the confluence with Lost Canyon Creek	567	6,800	11,500	14,500	36,000
Just upstream of the confluence with West Dolores River	270	3,700	6,000	7,500	20,000
West Dolores River					
At mouth	167	2,300	3,800	4,800	11,500
Mancos River					
At the Town of Mancos	83	1,250	2,230	2,750	4,420
Lost Canyon Creek					
At mouth	72	600	1,700	2,500	4,500
Chicken Creek					
At the Town of Mancos	22.3	490	800	950	1,370

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the riverine sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

For flooding sources studied in detail, other than shallow flooding areas, water-surface elevations for floods of selected recurrence intervals were computed through the use of the COE's step-backwater computer program, HEC-2 (References 1 and 2). For the detailed study area encompassing the Dolores River, West Dolores River, and Lost Canyon Creek, basic cross section input was derived from surveyed cross section information furnished by the Colorado Water Conservation Board. For the detailed study area encompassing the Mancos River and Chicken Creek, basic cross section input was derived from topographic maps, with digitized cross sections utilized at the time of map compilation (Reference 2).

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Insurance Rate Map (FIRM) (Exhibit 2).

For the streams studied by detailed methods, the profiles are used to determine the depth of water in the channel and adjacent flooded areas, as they were calculated using the HEC-2 computer program.

The 10-year flood would be contained within stream channels, while the 50-year flood would closely follow the pattern of the 100-year flood for the West Dolores River, Dolores River, and Lost Canyon Creek. In some sheetflow areas, broad overland flooding less than 2-feet on the average; and characterized by unpredictable flow paths, water-surface elevations are independent of those along adjacent streamways, and are affected principally by obstructions and local topography in the area flooded (Reference 1).

Cross sections used in the hydraulic analysis for Mancos River and Chicken Creek were obtained by both photogrammetric and field-survey methods. All bridges and other significant structures that might divert or restrict floodflows were surveyed. Because the digitized cross sections show the water-surface elevation in each stream on the date of photography, the cross sections were adjusted by field measurements to reflect the streambed elevations and an area beneath the mapped water surface for a discharge of 300 cfs in the stream at the time of photography. Floodplain roughness factors (Manning's "n") used in the hydraulic computations were selected based on field inspection of the actual floodplain conditions. Manning's "n" values for Mancos River ranged from 0.035 to 0.045 in the channel, and 0.060 to 0.100 in the overbanks. For Chicken Creek, Manning's "n" values ranged from 0.030 to 0.050 in the channel, and 0.040 to 0.070 in the overbanks.

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals.

The hydraulic analyses for this Flood Insurance Study are based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum (NGVD) of 1929.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages state and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study includes a floodplain boundary map designed to assist communities in developing sound floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section.

Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:4,800, with a contour interval of 2 feet and 10 feet NGVD for the Dolores River, West Dolores River, and Lost Canyon Creek (Reference 1). Topographic maps at a scale of 1:2,400, with a contour interval of 2 feet were used for Mancos River and Chicken Creek (Reference 2).

Approximate 100-year floodplain boundaries in some portions of the study area were taken directly from the Flood Hazard Boundary Map (FHBM) (Reference 7).

The 100-year floodplain boundaries are shown on the FIRM (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, and AO). Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary is shown on the FIRM (Exhibit 2).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment. One aspect of floodplain management involves balancing the economic gain from floodplain development with the resulting potential increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood can be carried without any substantial increase in flood height. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced.

For this Flood Insurance Study, floodways were not computed for the flooding sources.

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations (BFEs) or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within 500-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No BFEs or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use the zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100-year floodplain, and the location of selected cross sections used in the hydraulic analysis.

7.0 OTHER STUDIES

This Flood Insurance Study was prepared by compiling existing hydrologic and hydraulic technical and scientific data prepared by other organizations originally for purposes other than the NFIP. The data was identified as the best available at the time of compilation of this Flood Insurance Study, and should depict the general conditions of the flooding sources with relative accuracy. FEMA performed a cursory review and accepted the data as valid for purposes of this Flood Insurance Study and the NFIP. However, if better information is known to exist or has been developed since the date of this report, the information should be immediately forwarded to the Chief, Natural and Technological Hazards Division, FEMA, Denver Federal Center, Building 710, Box 25267, Denver, Colorado 80225-0267 for consideration for revision of this Flood Insurance Study.

A Flood Insurance Study for the Town of Dolores in Montezuma County, Colorado, is presently being prepared (Reference 6). The results of that study will be in complete agreement with this Flood Insurance Study.

A Flood Insurance Study for the Town of Mancos, Montezuma County, Colorado, was prepared September 29, 1986 (Reference 5). The results of that study are in complete agreement with this Flood Insurance Study.

A FHBM has been published for the community (Reference 7). The differences between the FHBM and this study are justified due to the more detailed nature of this Flood Insurance Study.

This Flood Insurance Study either supersedes or is compatible with all previous studies published on streams studied in this Flood Insurance Study and should be considered authoritative for the purposes of the NFIP.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Chief, Natural and Technological Hazards Division, FEMA, Denver Federal Center, Building 710, Box 25267, Denver, Colorado 80225-0267.

9.0 BIBLIOGRAPHY AND REFERENCES

1. U.S. Department of the Army, Corps of Engineers, Sacramento District, Flood Hazard Information, Dolores River and Tributaries, Dolores, Montezuma County, Colorado, September 1978.

2. Muller Engineering Co., Inc., Flood Plain Information Mancos River and Chicken Creek, Mancos, Colorado, Lakewood, Colorado, March 1982.

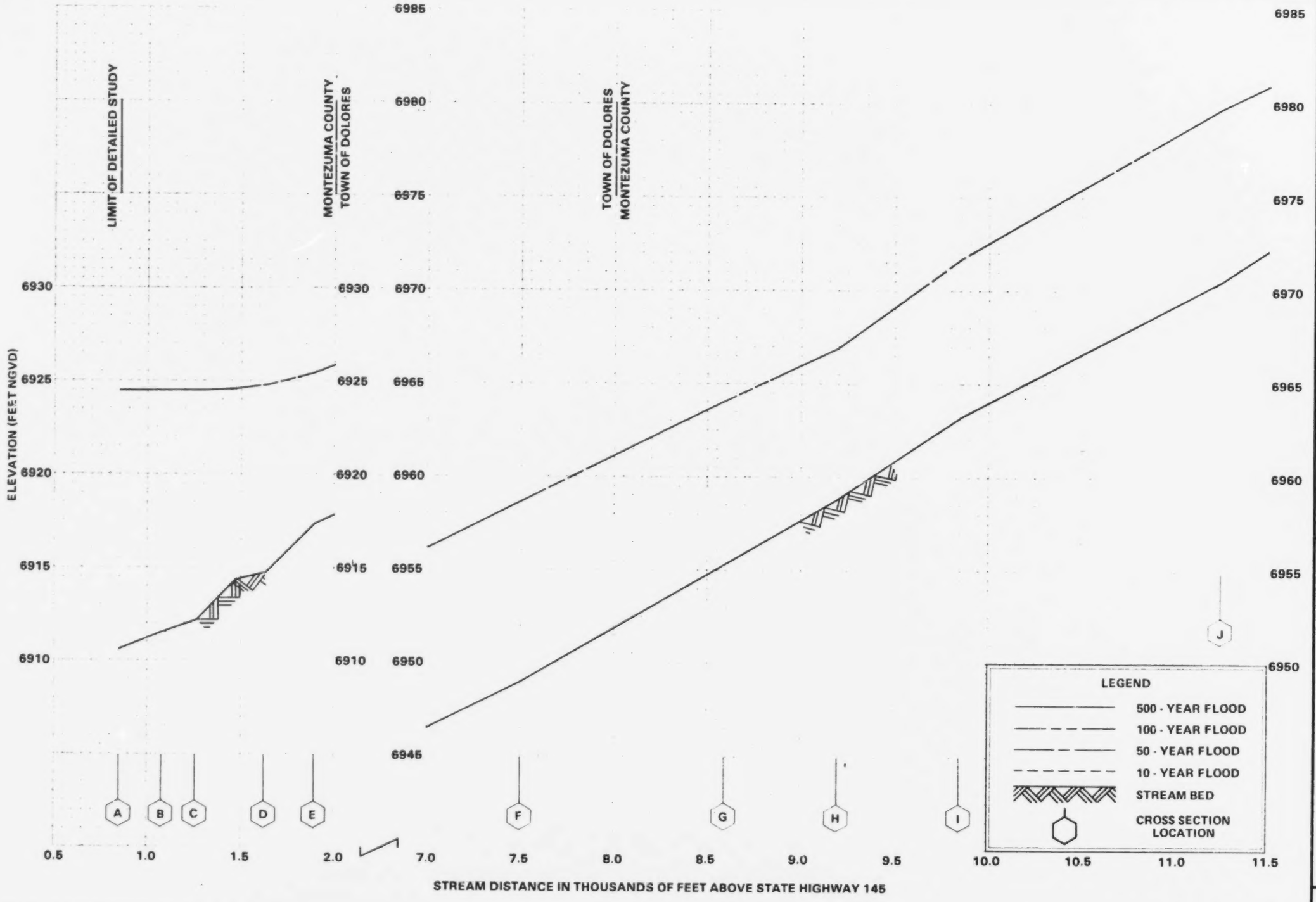
3. U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, Colorado, 1981.

4. Colorado Water Conservation Board, Manual for Estimating Flood Characteristics of Natural-Flow Streams in Colorado, Technical Manual No. 1, 1976.

5. Federal Emergency Management Agency, Flood Insurance Study, Town of Dolores, Montezuma County, Colorado, September 29, 1986.

6. Federal Emergency Management Agency, Flood Insurance Study, Town of Dolores, Montezuma County, Colorado (Unpublished).

7. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Montezuma County, Colorado (Unincorporated Areas), November 15, 1977.



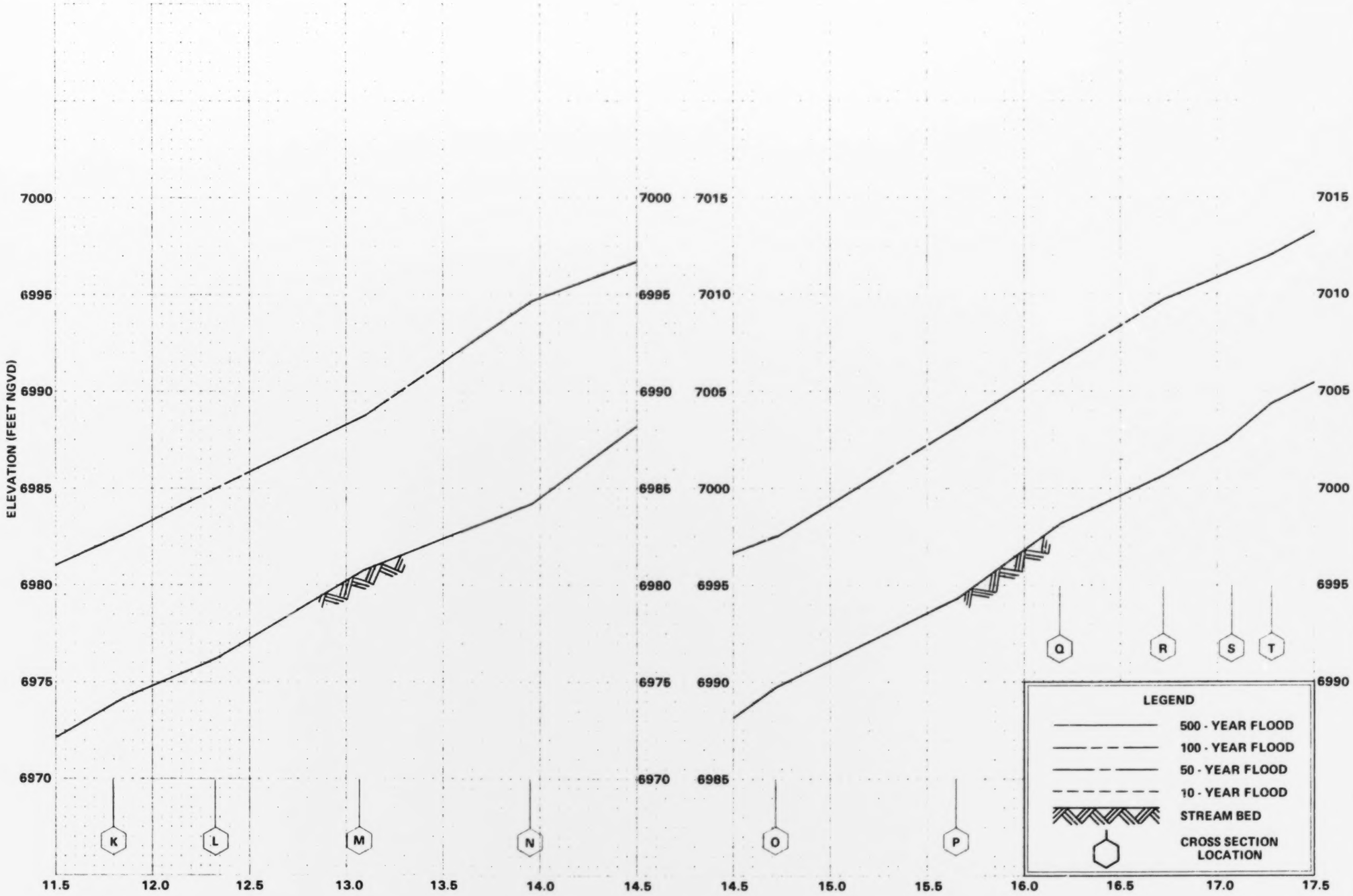
FLOOD PROFILES

DOLORES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONTEZUMA COUNTY, CO
(UNINCORPORATED AREAS)

01P



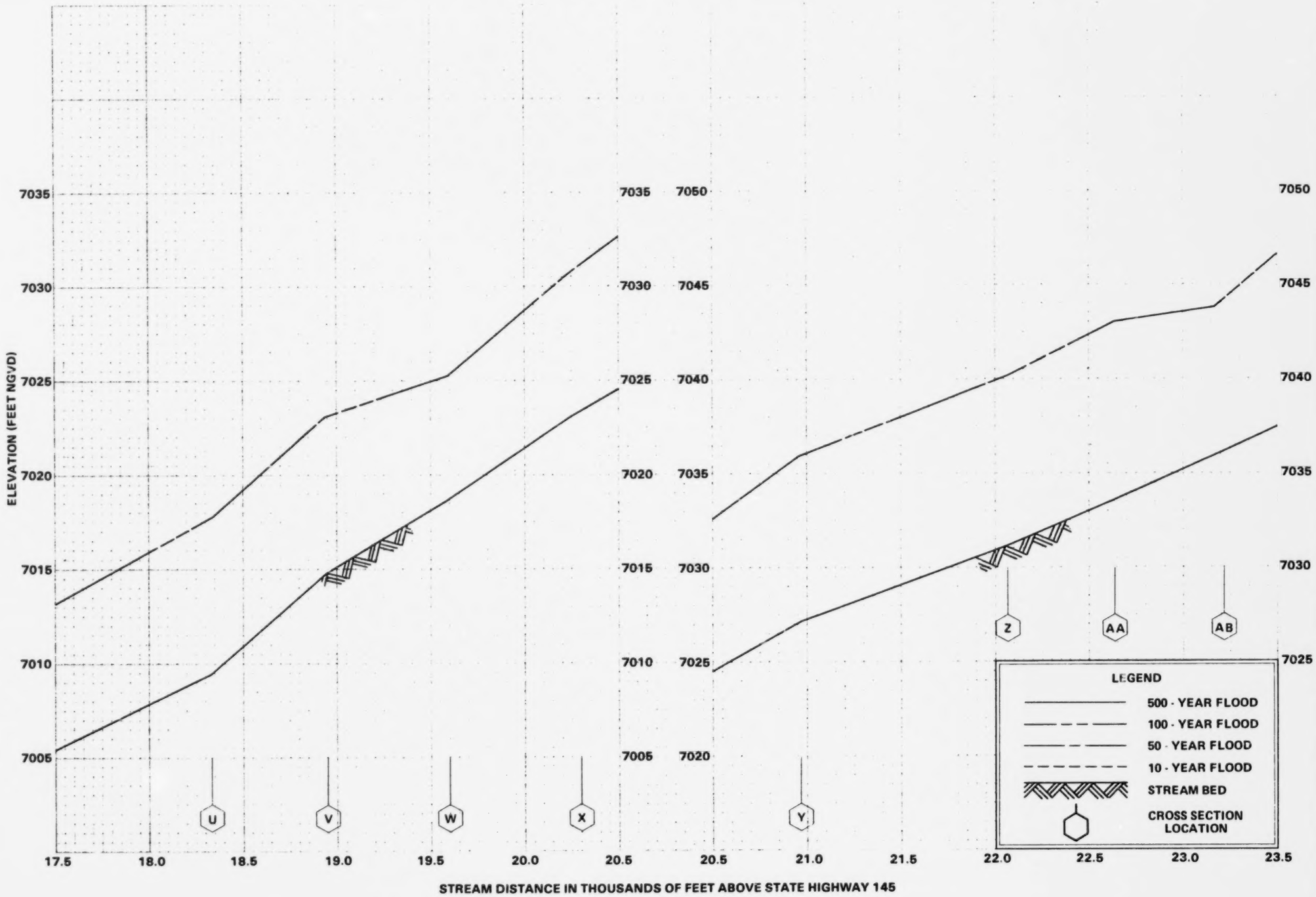
FLOOD PROFILES

DOLORES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONTEZUMA COUNTY, CO
(UNINCORPORATED AREAS)

02P



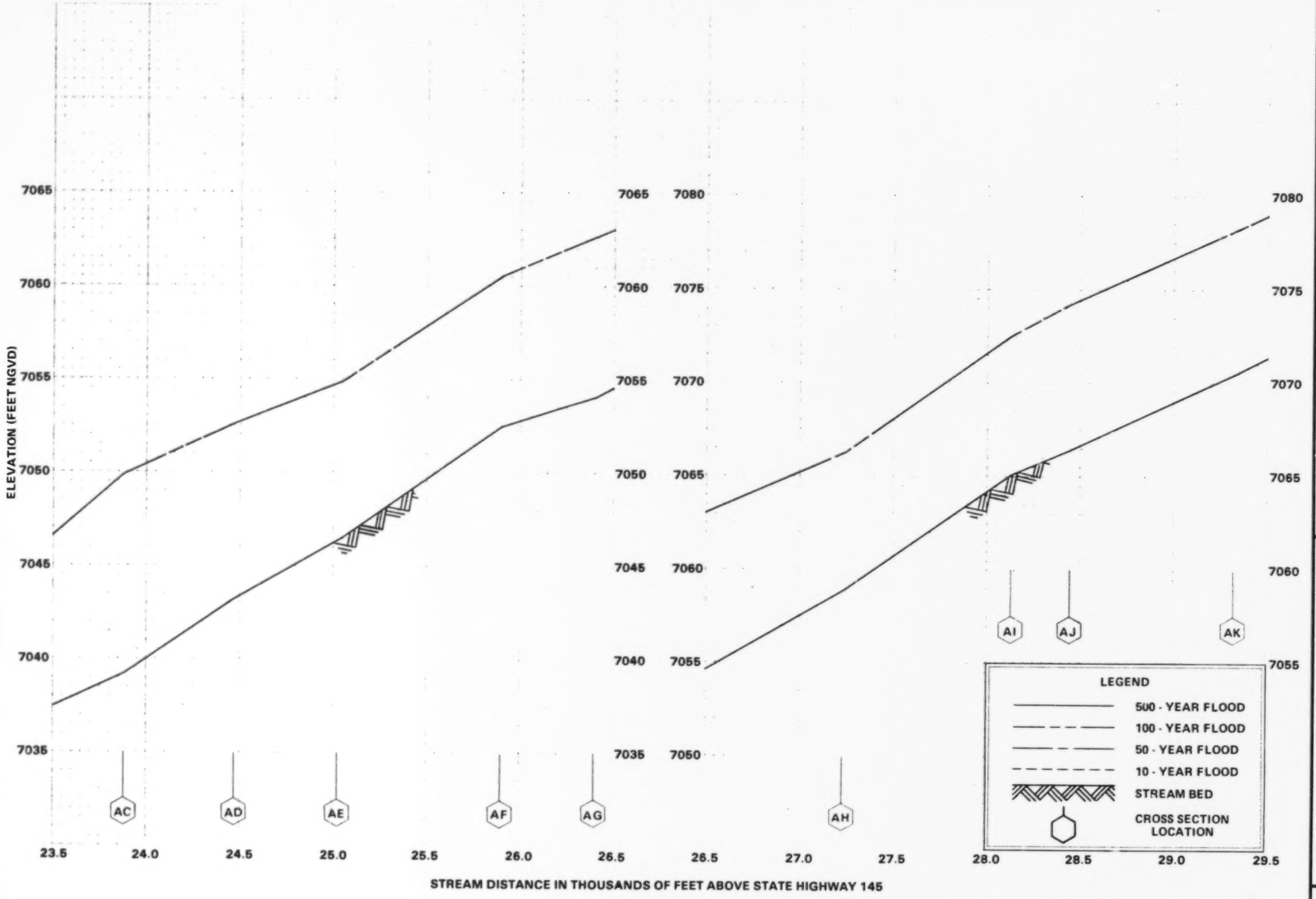
FLOOD PROFILES

DOLORES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONTEZUMA COUNTY, CO
(UNINCORPORATED AREAS)

03P



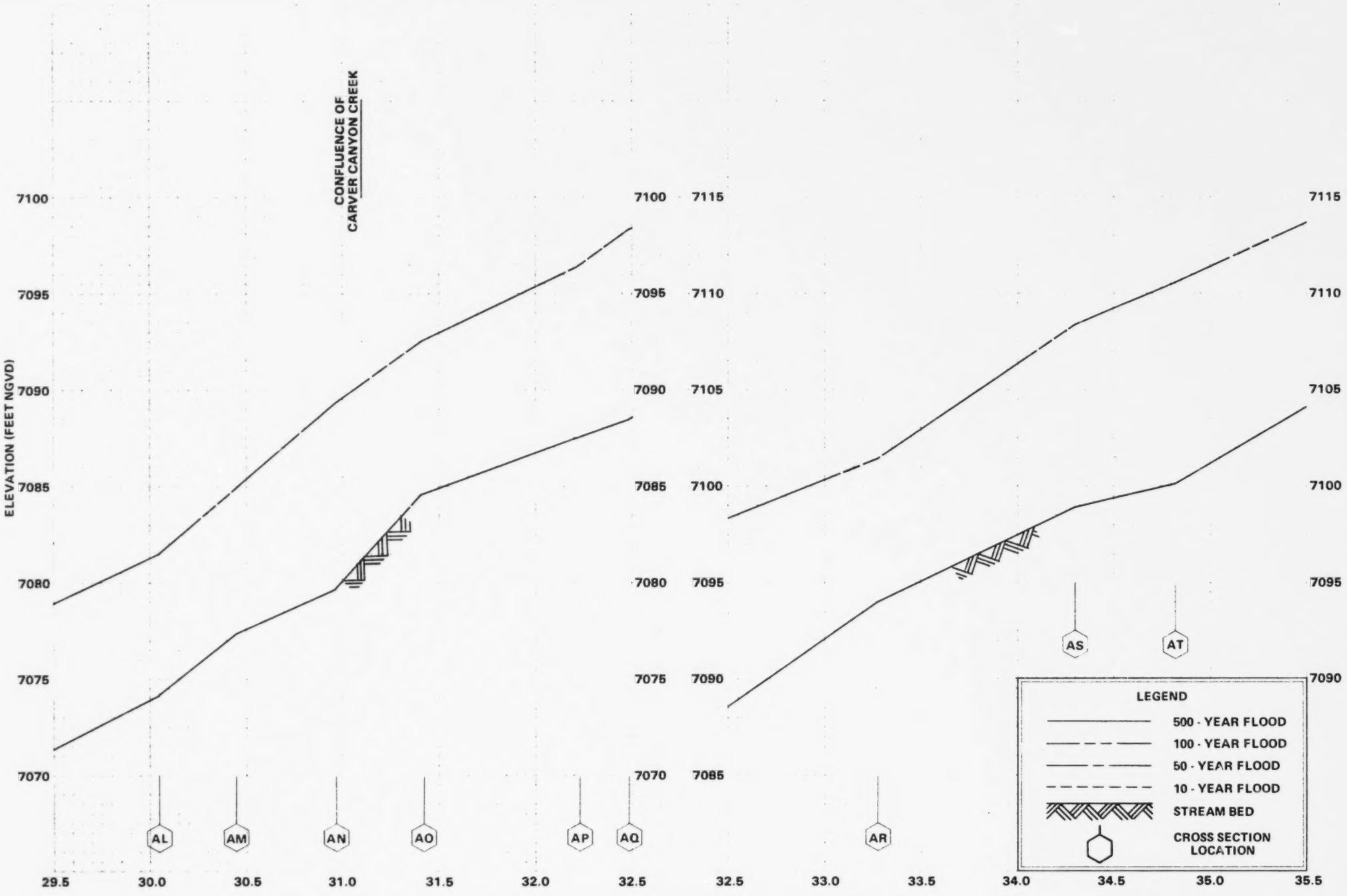
FLOOD PROFILES

DOLORES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONTEZUMA COUNTY, CO
(UNINCORPORATED AREAS)

04P



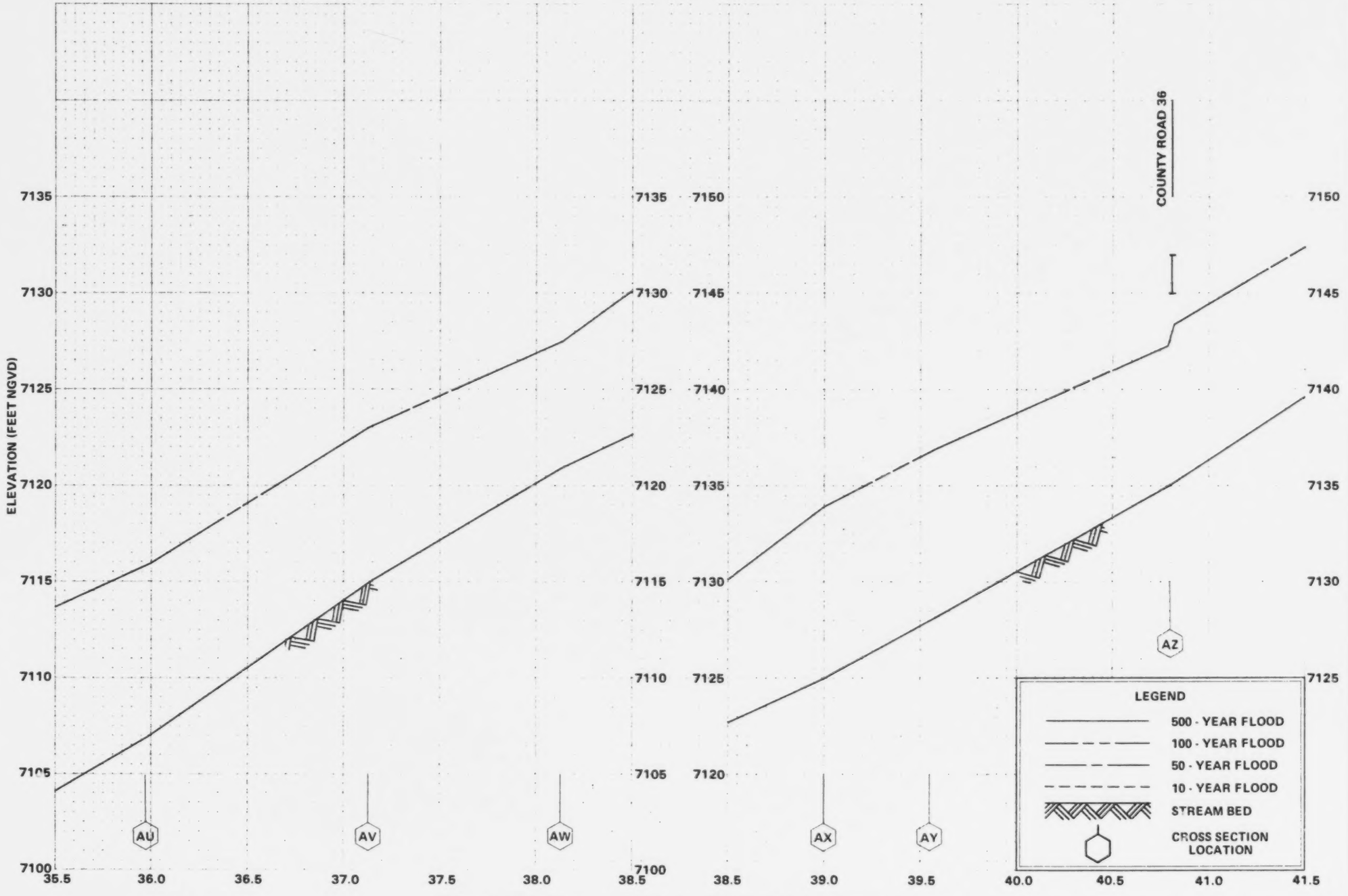
FLOOD PROFILES

DOLORES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONTEZUMA COUNTY, CO
(UNINCORPORATED AREAS)

05P



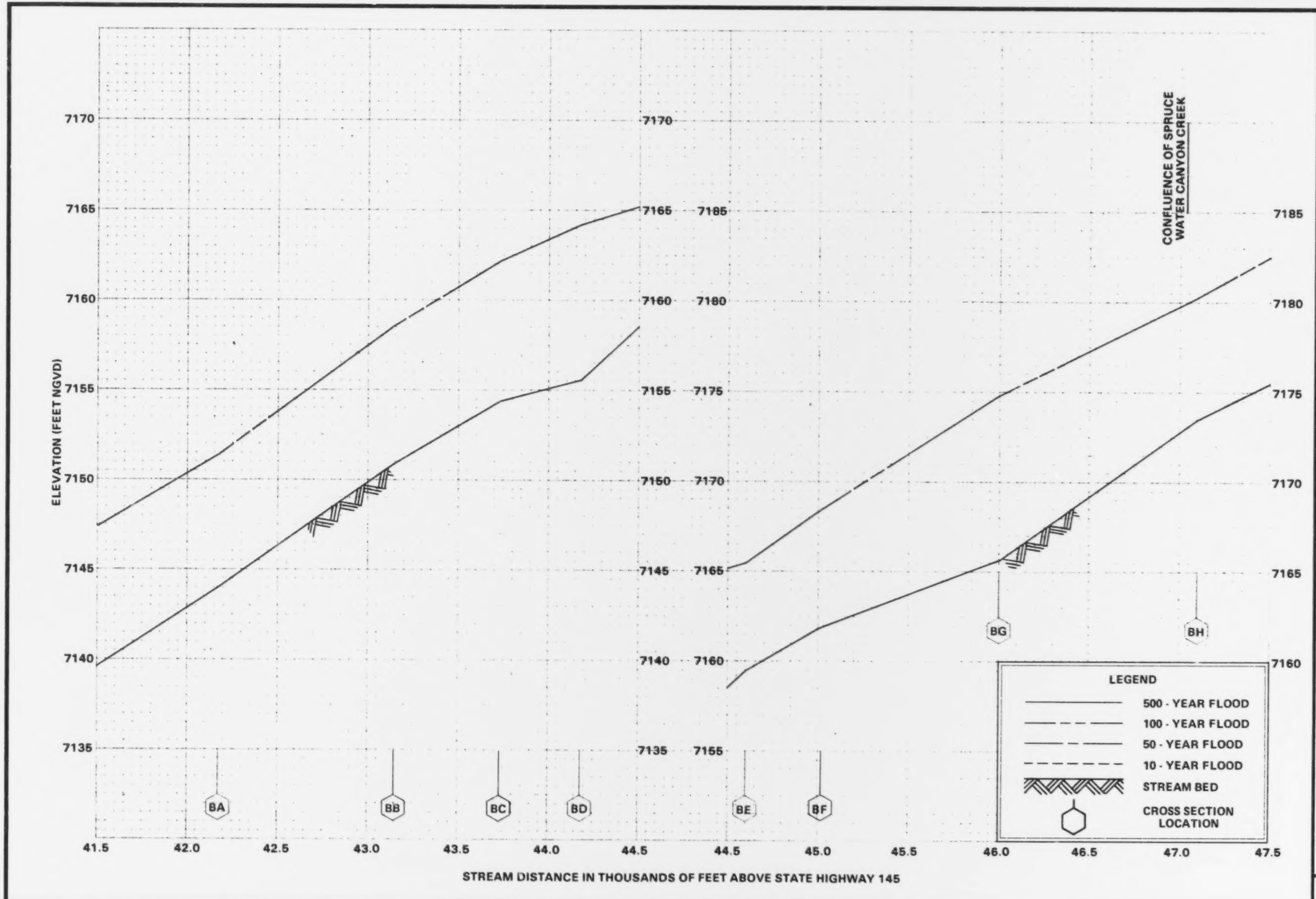
FLOOD PROFILES

DOLORES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONTEZUMA COUNTY, CO
(UNINCORPORATED AREAS)

06P



FLOOD PROFILES

DOLORES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONTEZUMA COUNTY, CO
(UNINCORPORATED AREAS)

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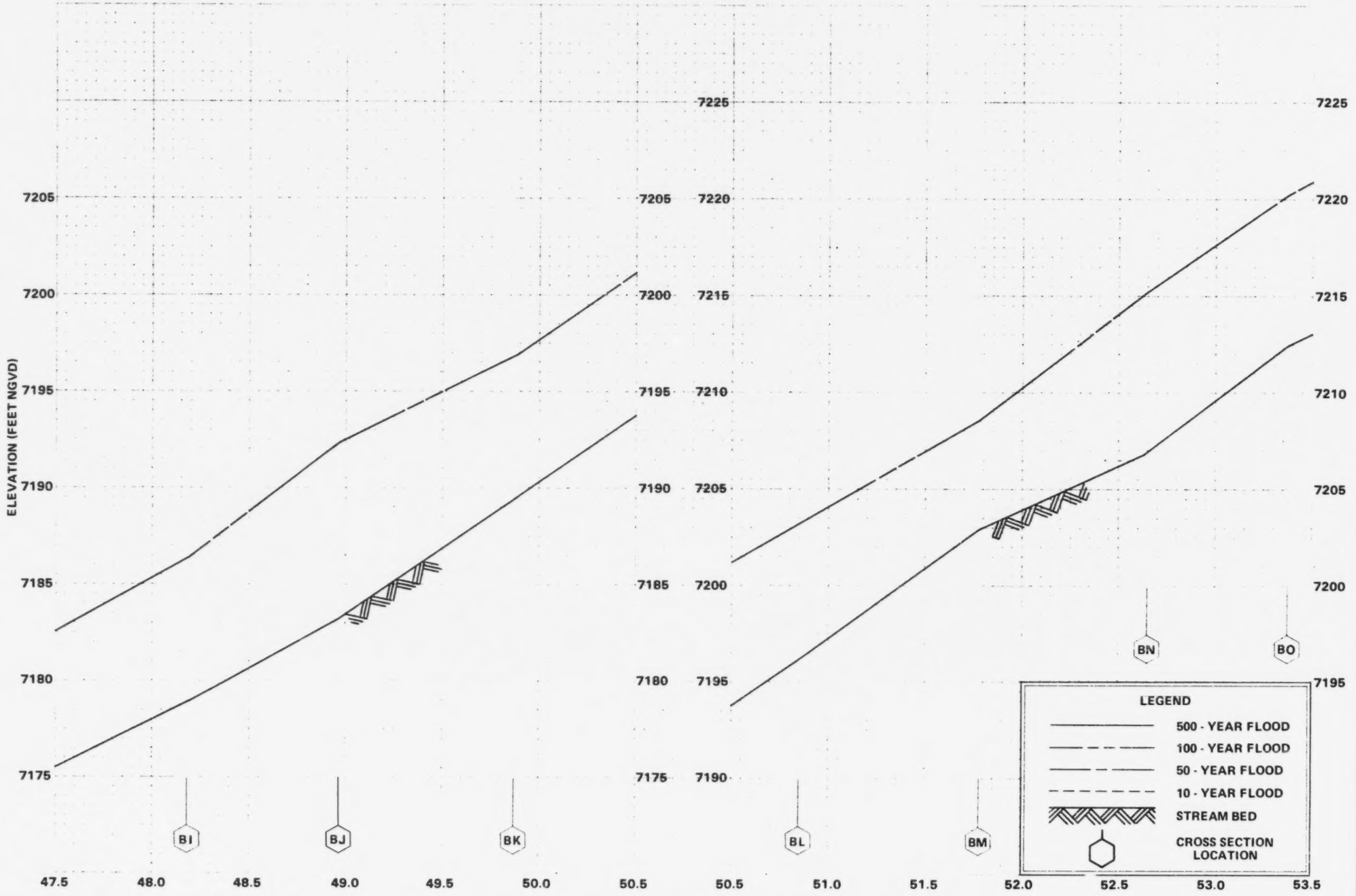


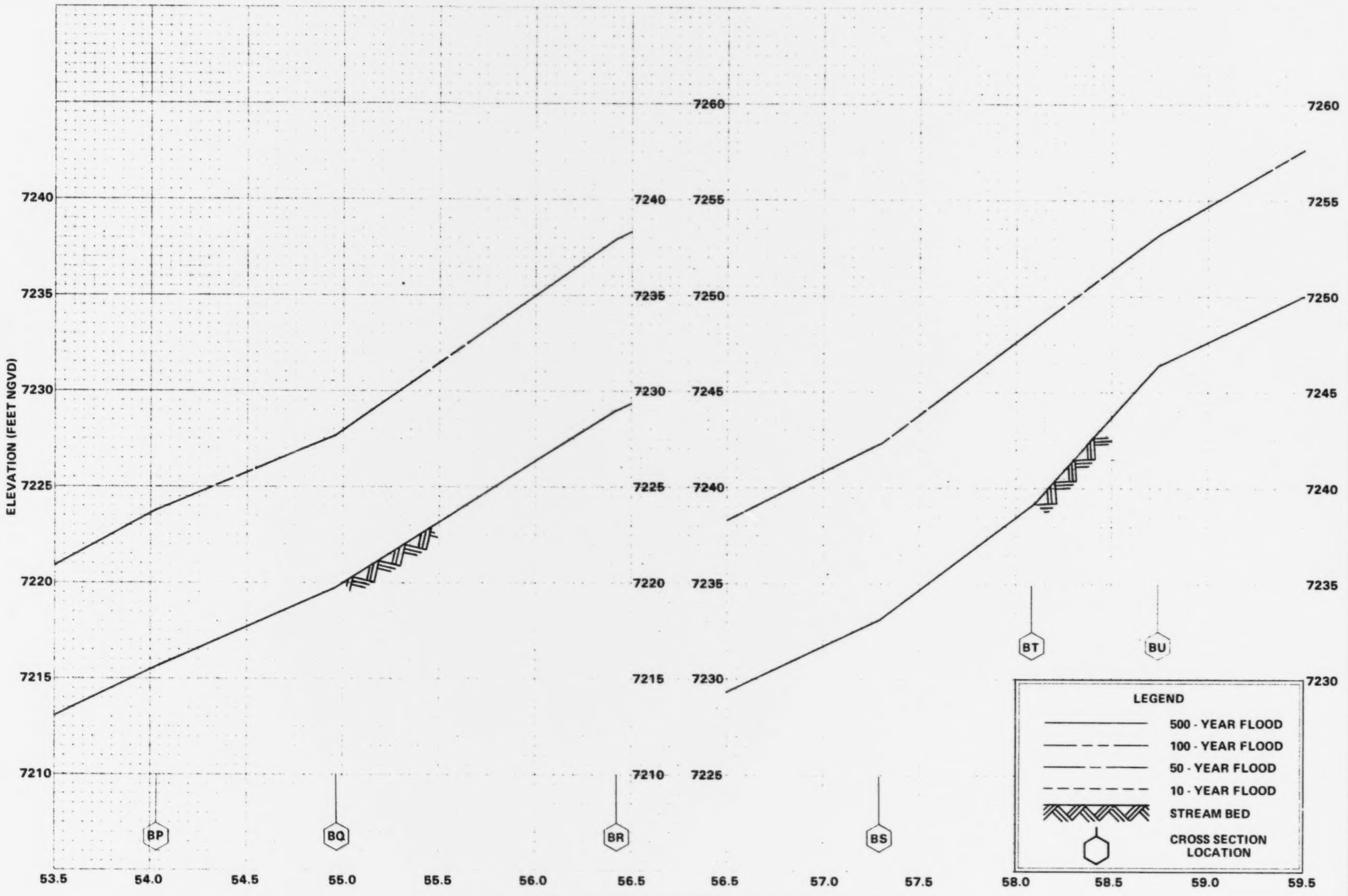
FLOOD PROFILES

DOLORES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONTEZUMA COUNTY, CO
(UNINCORPORATED AREAS)

08P



FLOOD PROFILES

DOLORES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONTEZUMA COUNTY, CO
(UNINCORPORATED AREAS)

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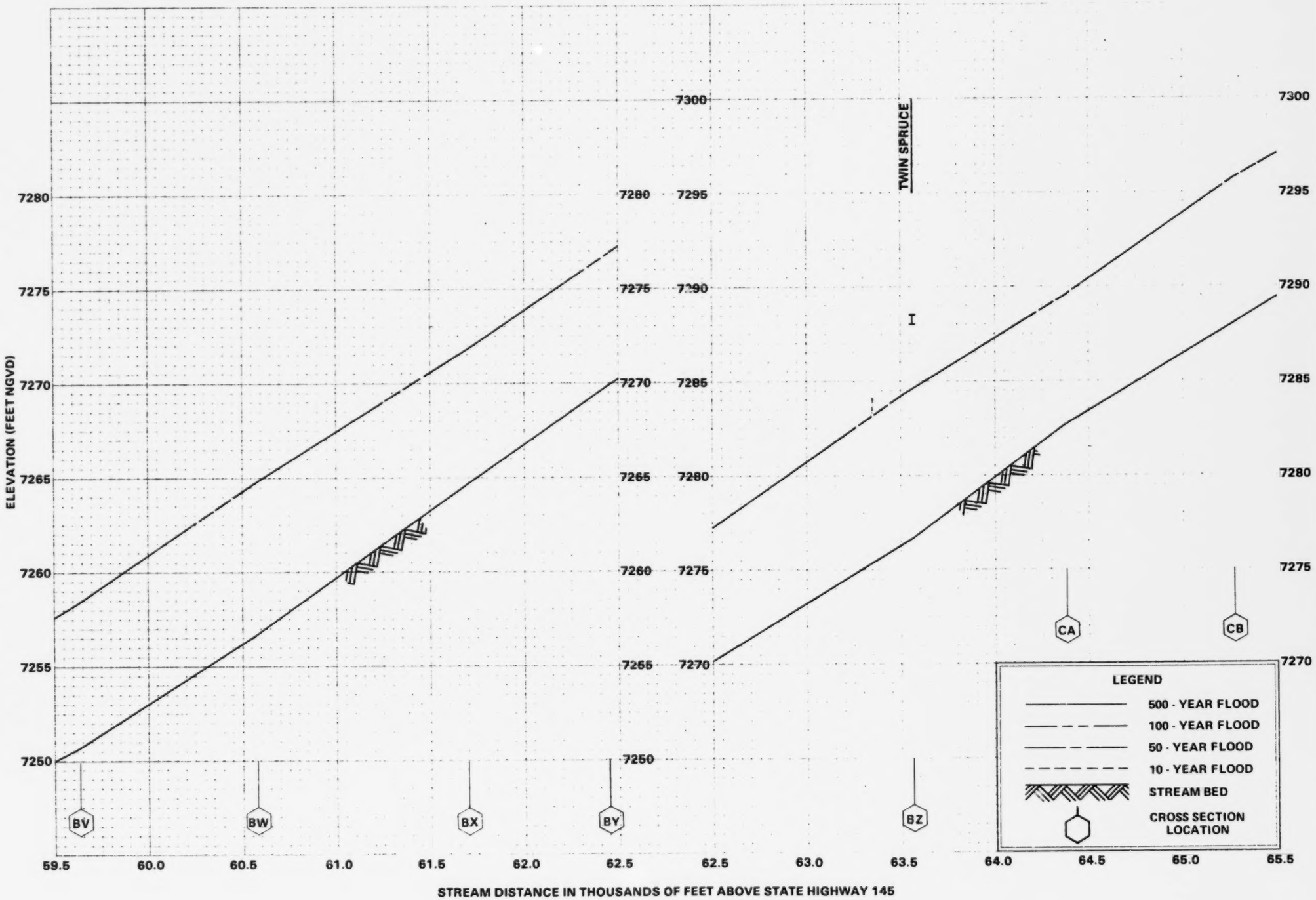


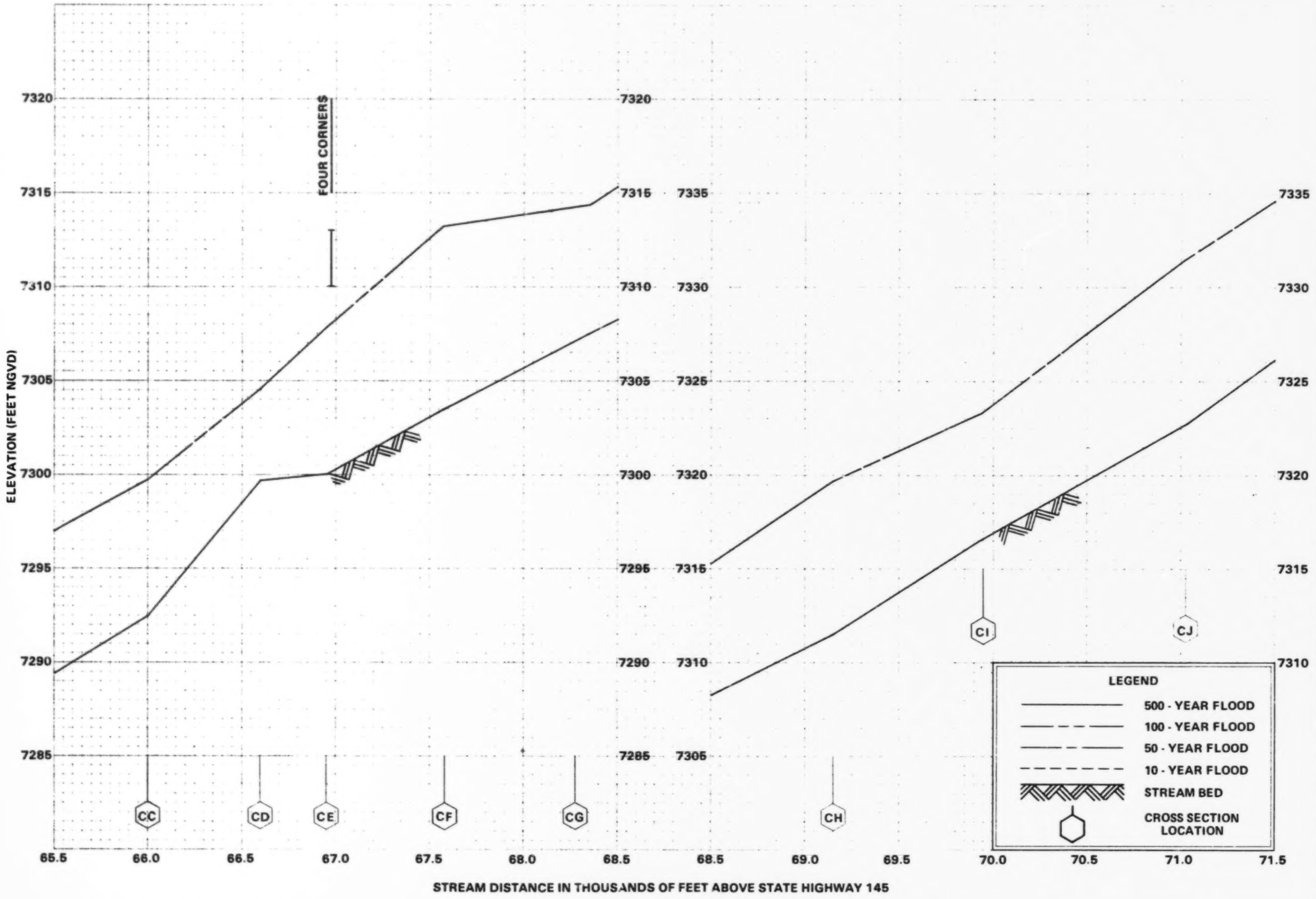
FLOOD PROFILES

DOLORES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONTEZUMA COUNTY, CO
(UNINCORPORATED AREAS)

10P



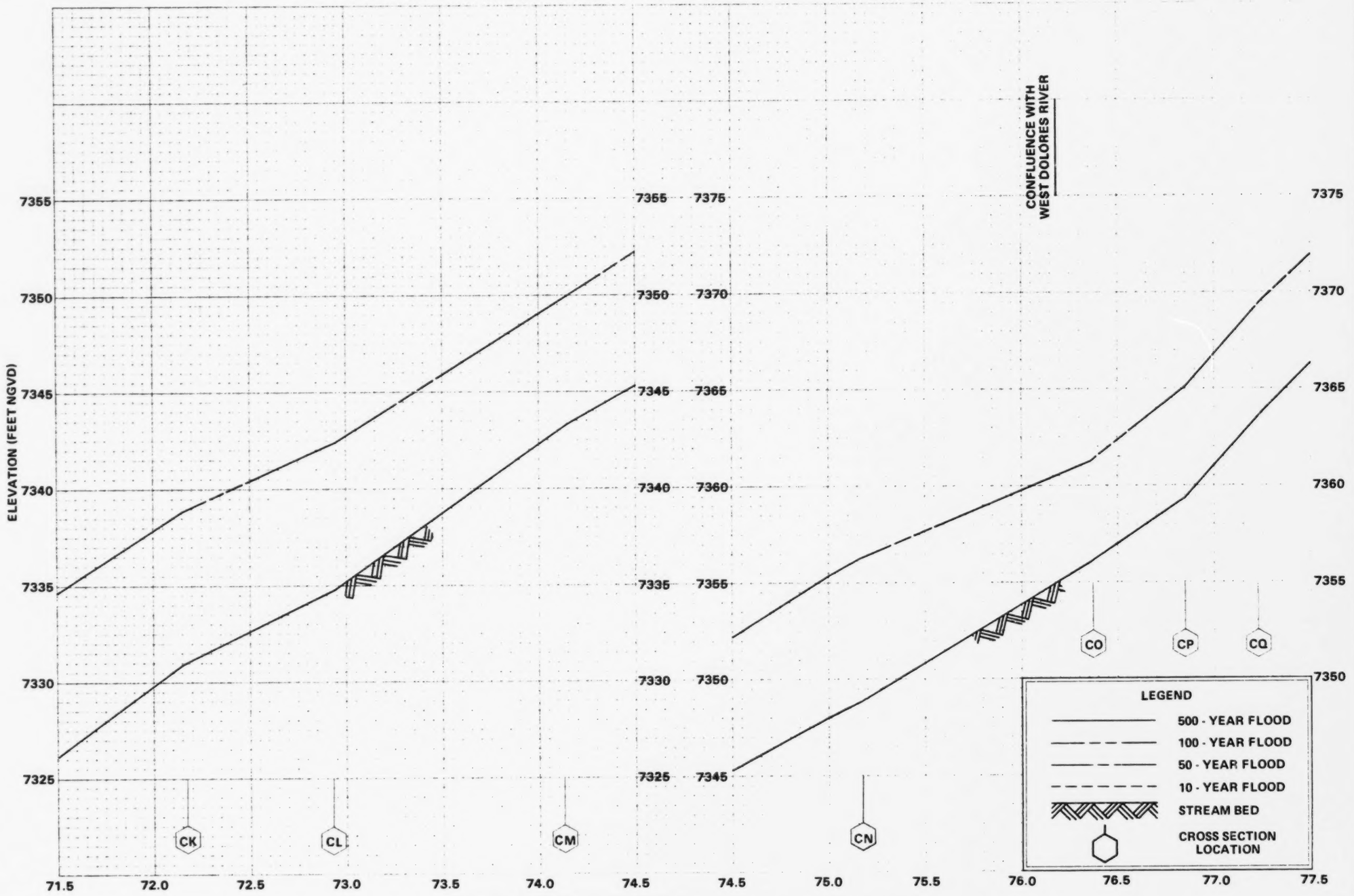
FLOOD PROFILES

DOLORES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONTEZUMA COUNTY, CO
(UNINCORPORATED AREAS)

11P



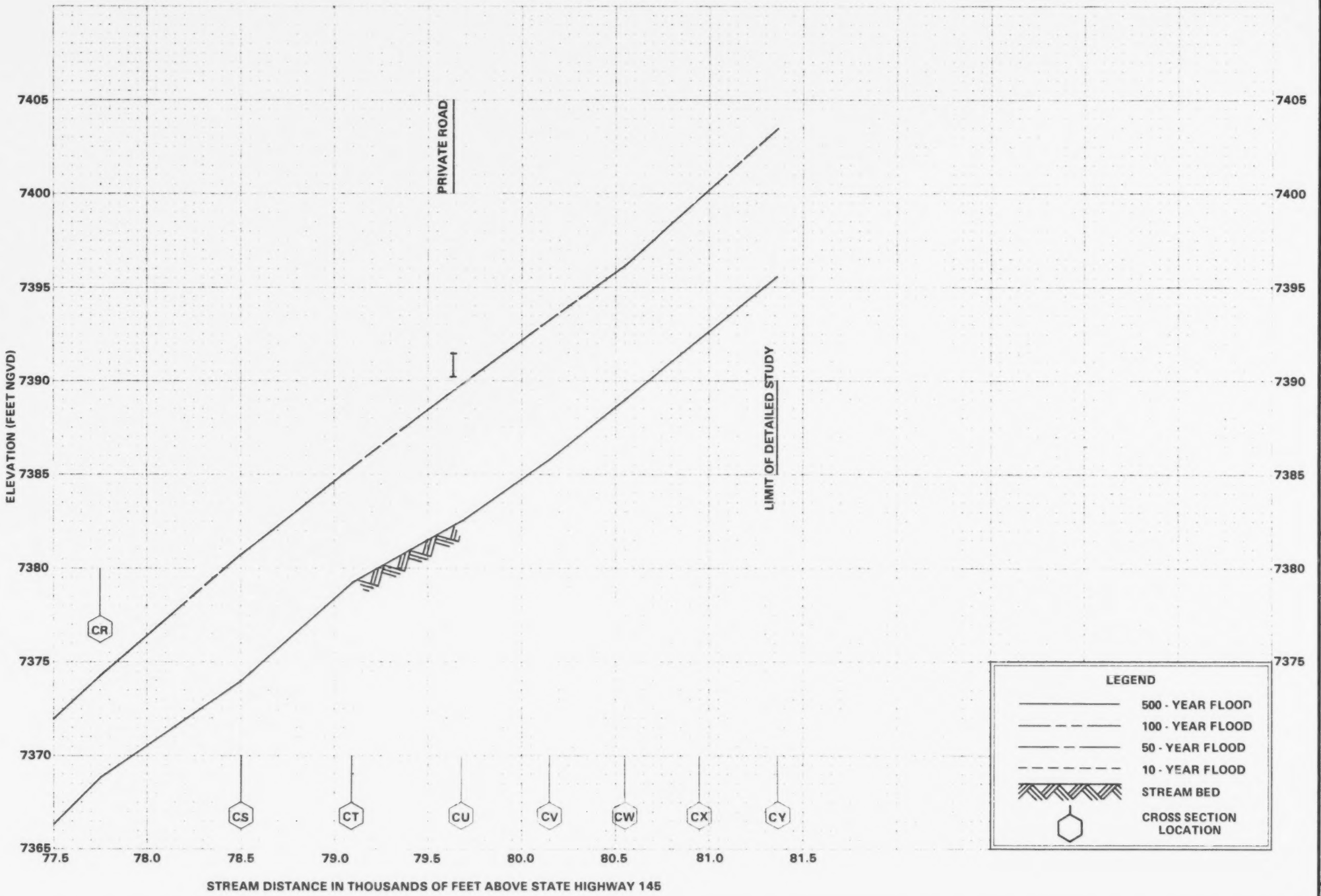
FLOOD PROFILES

DOLORES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONTEZUMA COUNTY, CO
(UNINCORPORATED AREAS)

12P



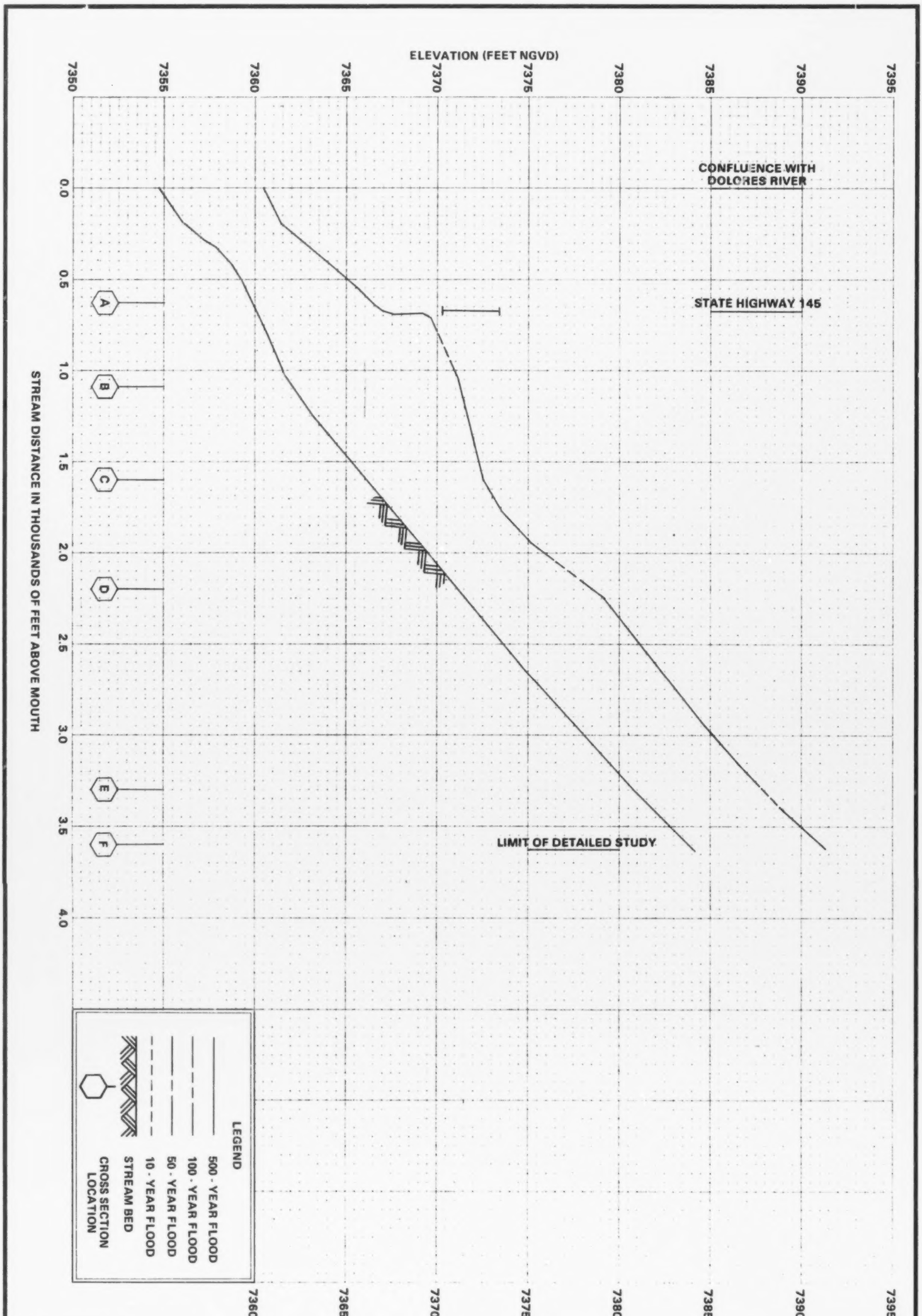
FLOOD PROFILES

DOLORES RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONTEZUMA COUNTY, CO
(UNINCORPORATED AREAS)

13P



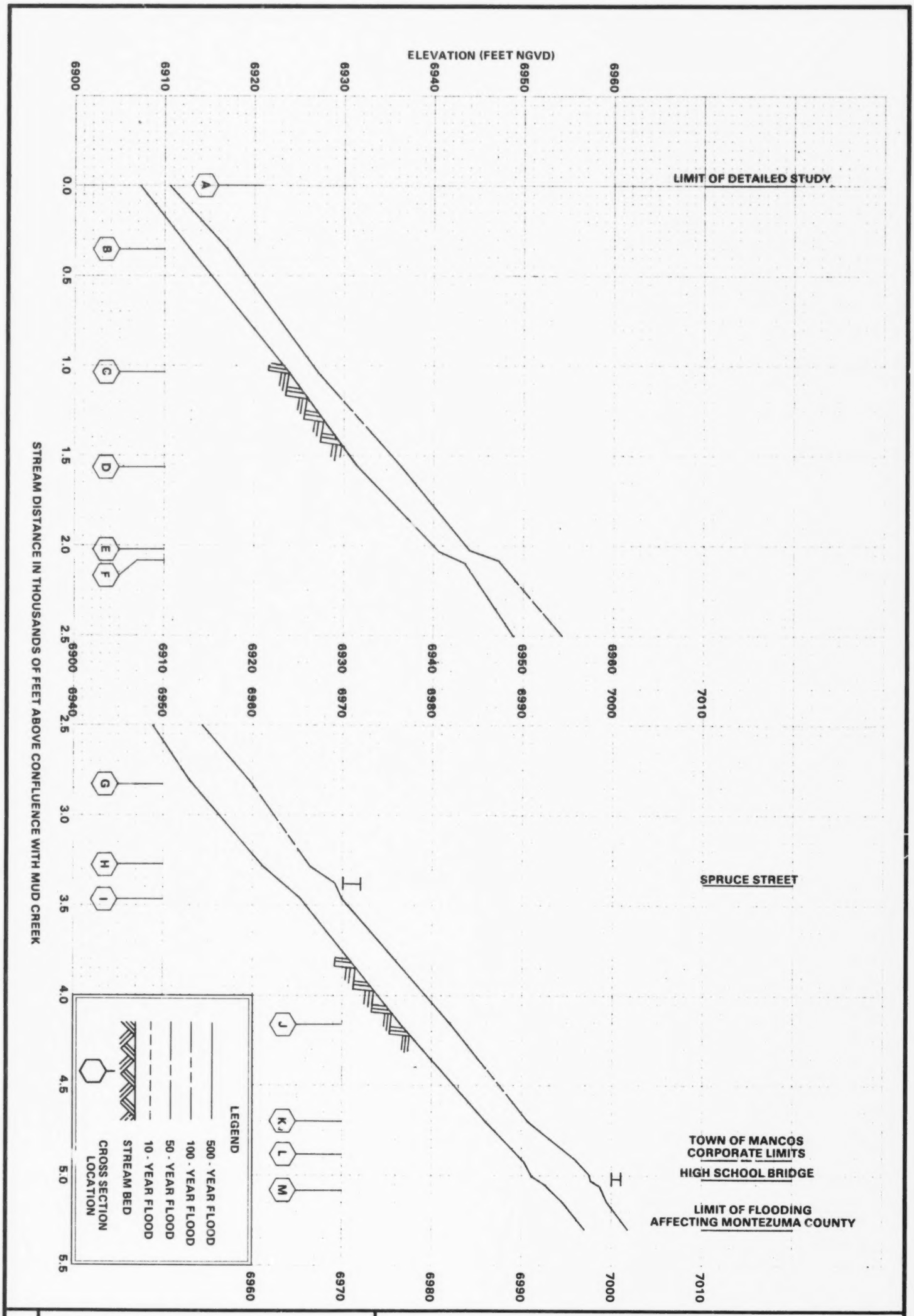
14P

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONTEZUMA COUNTY, CO
(UNINCORPORATED AREAS)

FLOOD PROFILES

WEST DOLORES RIVER



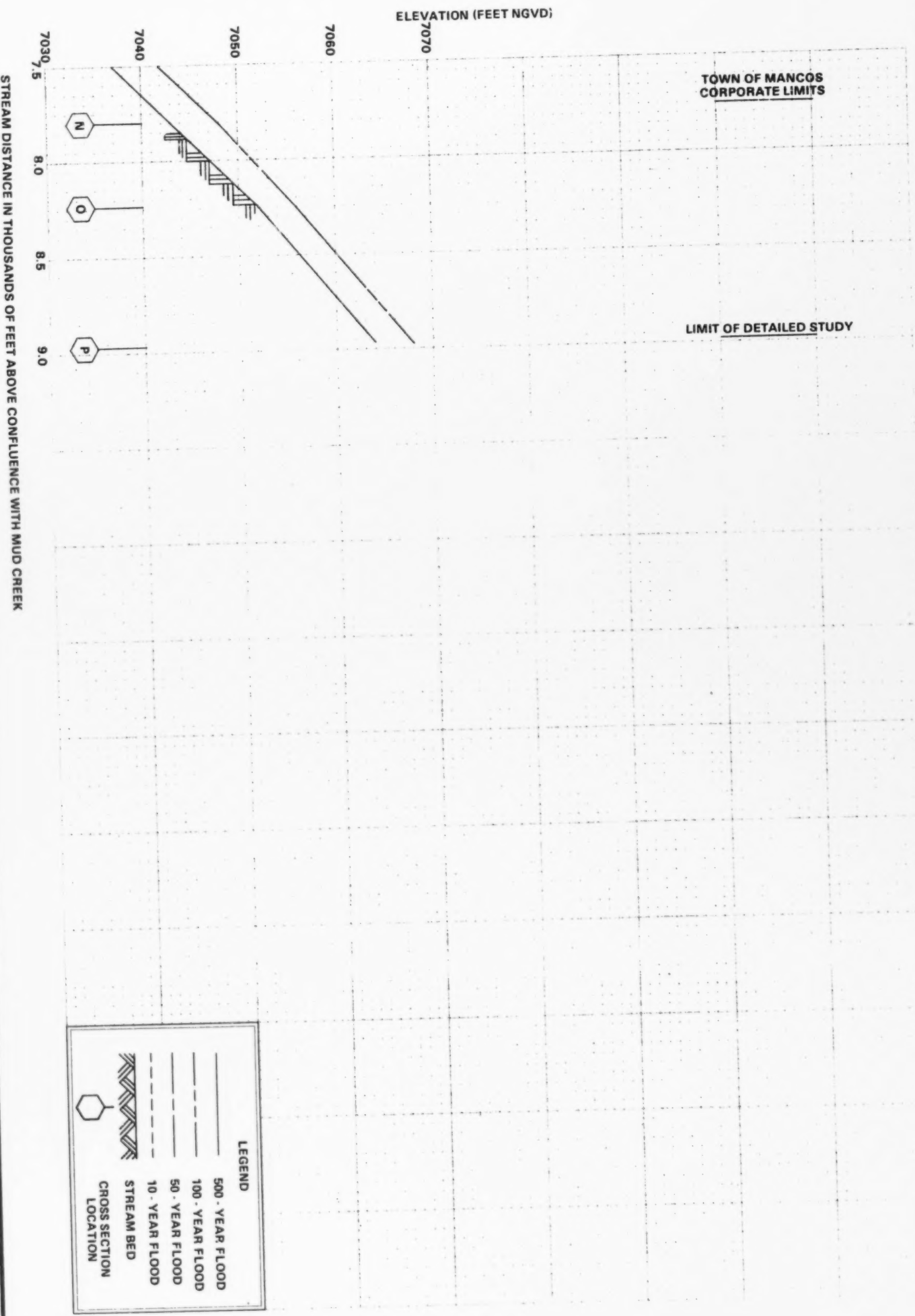
15P

FEDERAL EMERGENCY MANAGEMENT AGENCY

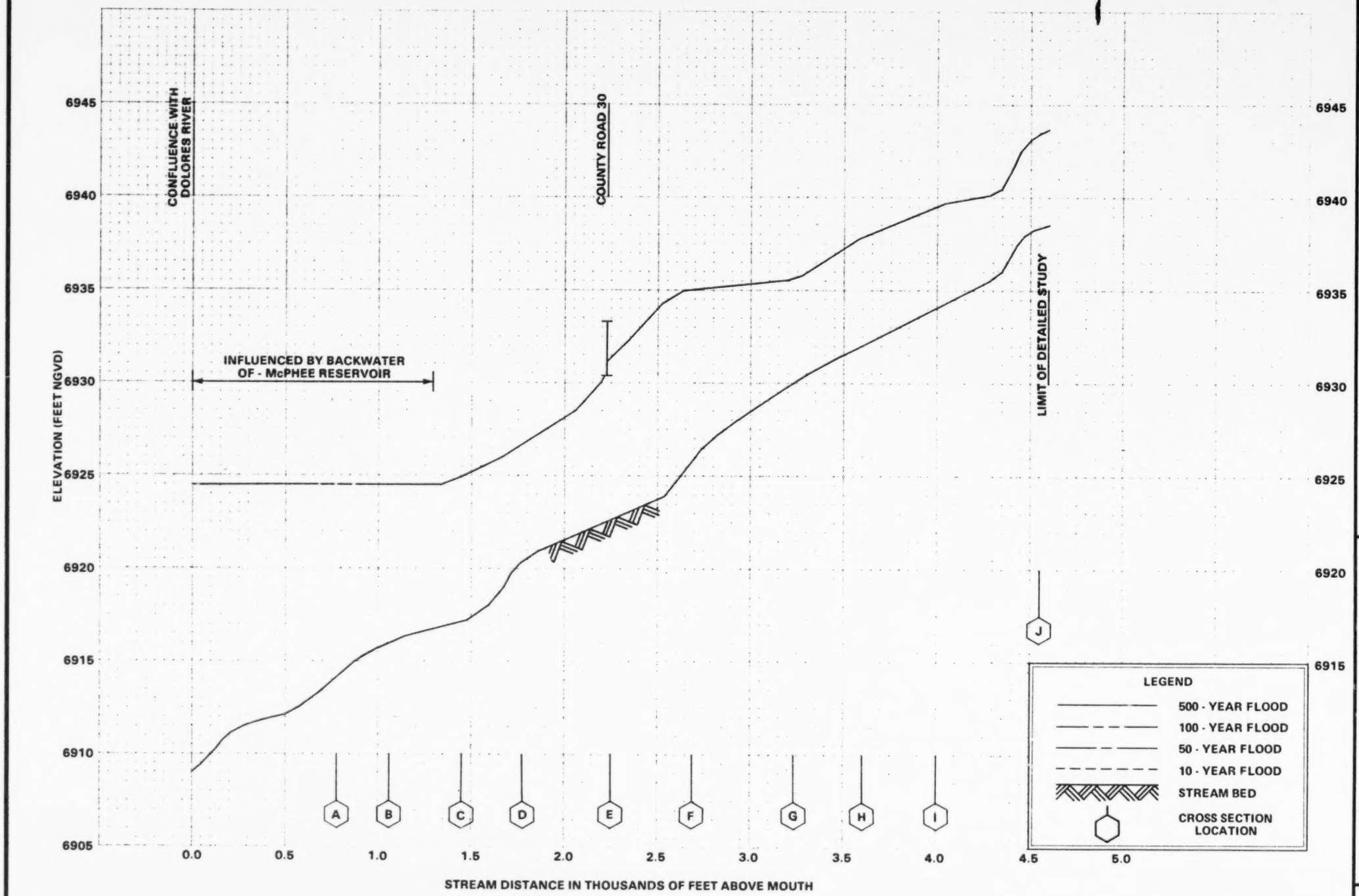
MONTEZUMA COUNTY, CO
(UNINCORPORATED AREAS)

FLOOD PROFILES

MANCOS RIVER



16P	FEDERAL EMERGENCY MANAGEMENT AGENCY **MONTEZUMA COUNTY, CO** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **MANCOS RIVER**



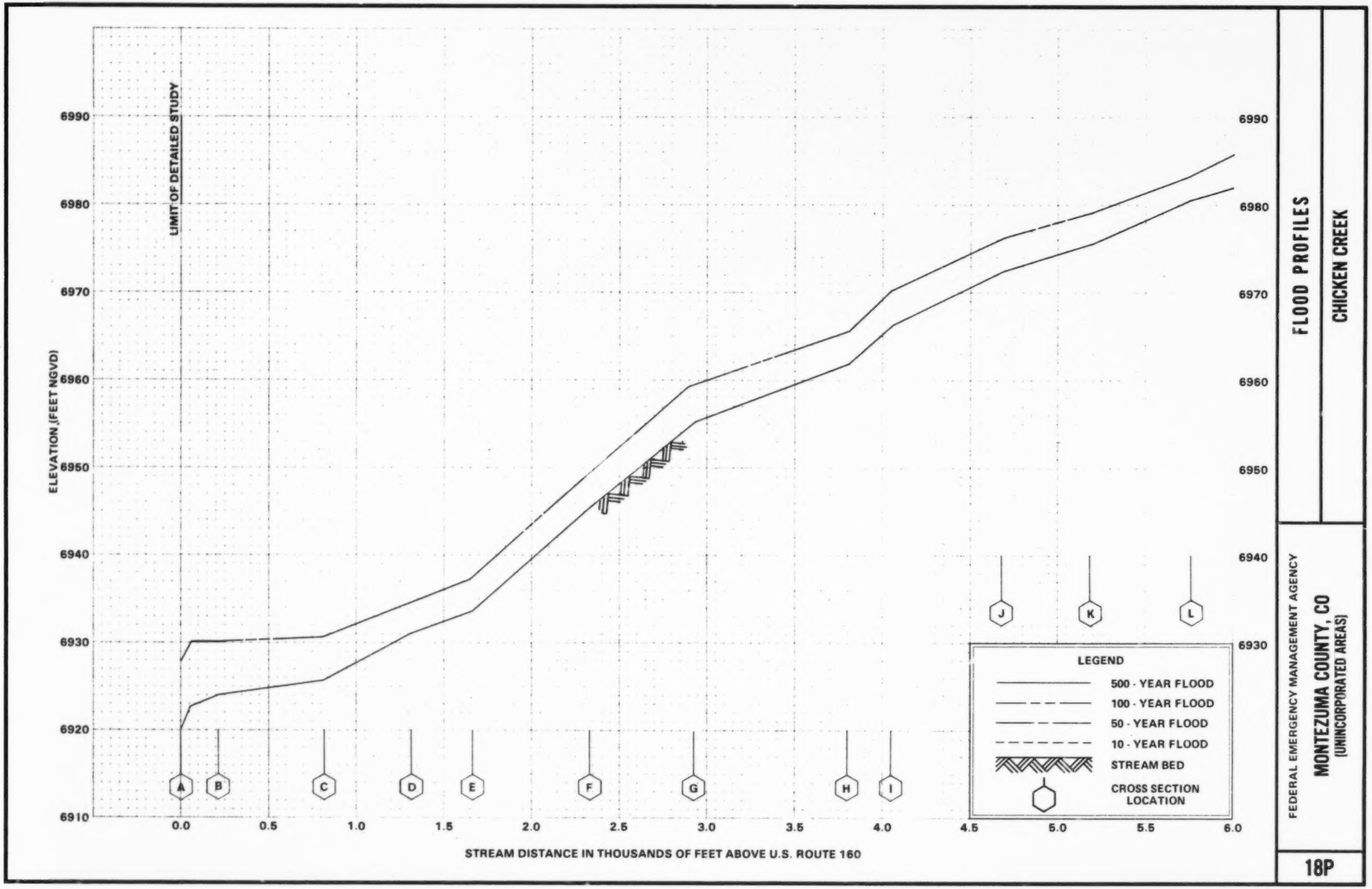
FLOOD PROFILES

LOST CANYON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONTEZUMA COUNTY, CO
(UNINCORPORATED AREAS)

17P



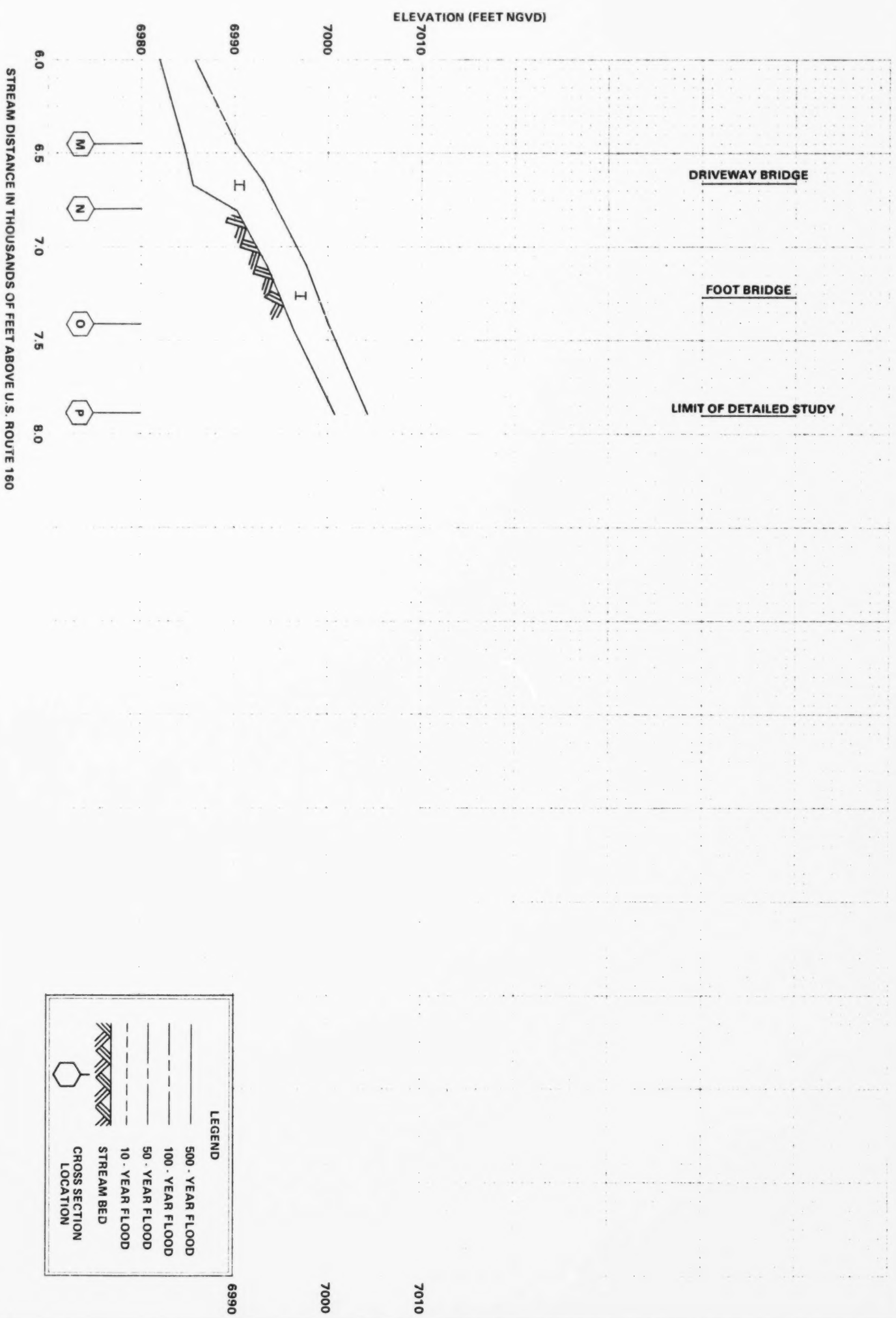
FLOOD PROFILES

CHICKEN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONTEZUMA COUNTY, CO
(UNINCORPORATED AREAS)

18P



19P	FEDERAL EMERGENCY MANAGEMENT AGENCY **MONTEZUMA COUNTY, CO** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **CHICKEN CREEK**

31

EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	Elevation (feet NGVD)	Description of Location
RM 1	6,969.60	Top of 1-1/2 inch pipe in rock mound at section corner on South Spruce Street, approximately 950 feet south of Riverside Avenue.
RM 2	7,014.69	Number 5 rebar with 1-1/2 inch cap located flush with ground on north side of Montezuma Road in line with west fence line of football field.
RM 3	7,089.05	Number 5 rebar with 1-1/2 inch cap set flush with ground 150 feet southwest of Montezuma Street and Old Highway 160 (Grand Avenue).
RM 4	7,054.39	Number 5 rebar with 1-1/2 inch cap set flush with ground 250 feet east of Mancos Wayside Park Road and 3 feet south of right of way fence.
RM 5	6,931.04	Number 5 rebar with 1-1/2 inch cap set 80 feet northwest of the 60 inch CMP and 100 feet southwest of the Old Railroad Grade.

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